TECHNICAL SPECIFICATIONS FOR 3 PHASES, LT CT METERS OF 100/5 AND 200/5 A, HAVING ACCURACY CLASS 0.5S WITH DLMS (Category-C)

1.SCOPE:

This specification covers the design, manufacture, assembly, inspection, testing at manufacturers works before dispatch, supply and delivery at site/FOR destination anywhere in " Gujarat State" static LT CT metes of Class 0.5s accuracy for tariff purpose along with other associated component as per requirement given in this specification which is based on IS-14697(2000), however meters matching with requirements of IEC-62053-11/21 or other international standards which ensure equal or better performance than the standards mentioned above shall also be considered.

(i)The meter shall be suitable for balanced as well as unbalanced load at all power factors i.e. Zero lag-Unity –Zero lead. The meter shall be capable to record and display kWh, KVARH, KVAH and maximum demand in kW for AC balanced/unbalanced loads for a power factor range of zero (lagging), unity and zero (leading) as per requirement given in this specification.

(ii) It is not the intent to specify completely herein all the details of the design and construction of meter. The meter shall, however, conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing for continuous commercial operation in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject the meter which is not in accordance therewith. The offered meter shall be complete with all accessories, hardware, software and components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.

(iii) The original manufacturer of LT AC Static Energy Meters who is registered vendor shall only quote against this tender. It is mandatory that in case of Indian manufacturer, the offered meter shall be ISI marked and bidder shall have to furnish valid BIS certification along with the offer and in case of foreign bidder the meter shall comply either BIS standard or standard of International Electro technical Commission, i.e. relevant IEC, shall be marked with the same and bidder must furnish valid BIS or IEC certification along with the offer, however the meter must comply this specification.

(iv) The 3 phase CT Operated meter for DLMS Protocol should comply as per IS 15959: 2011 for category 'C'. The bidder will have to submit the certificate of CPRI conforming above BIS along with the tender documents. If the certificate/relevant documents are not submitted, the bid will not be considered for further evaluation. However, the necessary documents, certification and samples to be submitted along with the technical offer should be conforming and compliant to DLMS as per IS 15959: 2011. The offers, not complying to above, shall be rejected without any further correspondence.

2. STANDARDS APPLICABLE:

Unless otherwise specified elsewhere in this specification, the performance and testing of the meters shall conform to the following Indian/International Standards and all related Indian/International standards to be read with up To-date and latest amendments/ revisions thereof:

IS 14697 (1999) with latest : AC static Watt-hour Meter Class 0.5 & 0.2 amendment
IEC 62053-11: Electrically Metering equipment (AC) –General Requirement, Test & Test condition
IEC 62053-21: Static Energy Meters for Active Energy
PFC Spec. : For high precision 3 vector energy meter
IS 9000 : Environmental testing
CBIP report No:304 : Specification for A.C. electrical energy meters.
IS 12346 : Specification for testing equipments for ac energy Meters
IS 2705 (Part -I&II): Specification for current transformers
IS 15959: 2011: Data Exchange for electricity meter reading, tariff & load control companion specifications.

3.CLIMATIC CONDITIONS:

The meters to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions. Meters shall be capable of maintaining required accuracy under hot, tropical and dusty climate.

a)	Maximum ambient air temperature in shade.	50°Cent.
b)	Minimum ambient temperature	(-) 5°Cent.
c)	Maximum relative humidity	95%
d)	Minimum relative humidity	10%
e)	Max Height above mean sea level	Up to 1000 meters.
f)	Dust storms likely to occur	Between March to July in a year
g)	Average number of thunder storm days per annum	40
h)	Average number of tropical monsoon months per annum	4 months
i)	Annual rain fall	10 cms. to 150 cms.
j)	Seismic level(Horizontal accn)	0.30g
k)	Iso-ceramic level (days per year)	50
l)	Maximum wind pressure	150 kg/sq.mt

The temperature range and relative humidity for performance of meters shall be as per relevant standards.

4.GENERAL AND CONSTRUCTIONAL REQUIREMENTS:

4.1. Meter shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following shall be ensured.
  4.1.1. Personal safety against electric shock
  4.1.2. Personal safety against effects of excessive temperature
  4.1.3. Protection against spread of fire
  4.1.4. Protection against penetration of solid objects, dust and water
4.2. All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy.
4.3. The meter shall be designed and manufactured using SMT (Surface Mount Technology) components.
4.4. All insulating material used in the construction of meter shall be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating.

4.5. The meter shall have an operation indication device such as a blinking LED. The operation indicator shall be visible from the front window and capable of being monitored conveniently with suitable testing equipment.

4.6. The meter shall conform to the degree of protection IP 51 of IS: 12063/IEC: 529 for protection against ingress of dust, moisture and vermin's.

4.7. The meter shall be supplied with a transparent extended terminal block cover (ETBC).

4.8. The polycarbonate material of only following manufacturers shall be used.

a) GE PLASTICS	LEXAN 943A FOR COVER AND TERMINAL COVER/ LEXAN 503R FOR BASE & TERMINAL BLOCK
b) BAYER	GRADE CORRESPONDING TO ABOVE
c) DDW CHEMICALS	-DO-
d) MITSUBISHI	-DO-
e) TEJIN	-DO-
f) DUPONT	-DO-

The meter base shall be manufactured from high quality industrial grade material viz. Polycarbonate with 10 % glass filled which shall meet following properties to ensure higher reliability and long life of the meter base.
(1) Meter base & cover and (2) terminal cover shall conform to the following.

Sr. No	Test	10% Glass filled non-transparent material for meter base & terminal block	Transparent material for meter cover & terminal cover
1	UV ageing for 200 Hrs. as per ASTM : G53(CL No. 9.3)	4 Hours UV at 60° C, 4 Hours condensation at 50° C	4 Hours UV at 60°C, 4 Hours condensation at 50° C
2	Boiling water test(10 MIN)	No softening & whitening & No change in colour, shape, size & dimensions	No softening & whitening & No change in colour, shape, size & dimensions
3	Ball pressure test as per IEC--60695-10-2	125°C +/- 2°C	125°C +/- 2° C
4	Flammability Test (a) As per UL 94 or (b) As per IS 11731(Part-2) 1986	 VO FVO	 VO FVO
5	Glow wire test IS:11000(part 2/SEC-1) 1984 OR IEC PUB,60695-2-12	960° C	850° C
6	Heat deflection Temp.(HDT) HDT/Ae, 1.8MPa edge(100mm) As per ISO 75/Ae	132° C	125° C

4.8.1 The terminal block shall be of high grade non-hygroscopic, fire retardant, low tracking fire resistant, reinforced poly-carbonate or equivalent high grade engineering plastic which shall form an extension of the meter case and shall have terminal holes and shall be of sufficient size to accommodate the insulated conductors & meeting the requirement of IS 14697:1999/CBIP technical report-304.

4.8.2 The meter cover shall be fully transparent. However, in case of non transparent cover the window shall be of fully transparent Polycarbonate material for easy reading of all the displayed values/ parameters, name plate details and observation of operation indicator. The fixing of the window with the cover in the later case shall be temper proof, dust proof & moisture proof.

4.8.3 The meter cover and base shall be suitably shielded with metallic material so as to protect the meter from adverse effect of AC/DC Abnormal external magnetic field. The meter shall meet the requirements of CBIP-304 with its latest amendment for immunity against continuous magnetic induction.

The terminal block, the ETBC meter cover & meter base shall ensure reasonable safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them.

4.9 The terminals shall have suitable construction with barriers and cover to provide firm and safe connection of current and voltage leads of stranded copper conductors or copper reducer type terminal ends (thimbles).The manner of fixing the conductors to the terminal block shall ensure adequate and durable contact such that there is no risk of loosening or undue heating. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life of the meter shall be such that the risk of corrosion resulting from contact with any other metal part is minimized. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material. The internal diameter of the terminal holes shall be 8.5 mm minimum. The clearance and creep-age distance shall conform to relevant clause of 14697(1999)/CBIP technical report no.-304(latest version)

4.10 The meter shall be compact in design. The entire design and construction shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter shall be convenient to transport and immune to shock and vibration during transportation and handling.

4.11 All parts that are likely to develop corrosion shall be effectively protected against corrosion. The construction of the meter shall be such as to be sealed independently and prevent unauthorized tampering.

PRINTED CIRCUIT BOARD

The fully tested double layered glass epoxy shall be used. The latest technology such as hybrid microcircuit or application specific integrating circuit (ASIC) shall be used to ensure reliable performance. The mounting of components on the PCB shall be SMT (Surface Mounted Technology) Type. The electronic components used in the meter shall be of high quality from world renowned manufacturers and there shall be no drift in accuracy of the meter for at least up to Guarantee period. The make/grade and the range of the components should be from the following list.

Sr No	Component function	Requirement	Makes and Origin
1	Current Transformers	If the Meter is with one current transformers as measuring elements. The current transformer should withstand for the clauses under 5&9 of IS- 14697 /1999	ORIGIN CONFORMING TO IS-2705 OR RELEVANT STANDARD.

2	Measurement Chips	The measurement or computing chips used in the Meter should be with the Surface mount type along with the ASICs.	USA: Anolog Devices, Cyrus Logic, Atmel, Philips South Africa :SAMES Japan : NEC
4	Quartz Crystal		AVX, VANLONG, ADVANCED CRYSTAL etc
5	Memory chips	The memory chips should not be affected by external parameters like sparking, high voltage spikes or electrostatic discharges.There shall be security isolation between metering circuit, communication circuit & power circuit.	USA: Atmel, National Semiconductors, Texas Instruments, Philips, ST, Japan : Hitachi
6	Display modules	a) The display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted. c) The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). d) It should be trans- reflective STN type industrial grade with extended temperature range.	Display TEK/KCE/RCL Display /Suzhou heng Xiamen instruments/ Veritronics/ Bona-fide/ Jebon VIZ. Hongkong : Genda Singapore: Bonafied Technologies. Korea: Advantek China : Success Japan : Hitachi, Sony. TIANMA,Haijing, Holtek,
7	Communication Modules	Communication modules should be compatible for the optical port for communication with meter reading instruments.	USA: National , Semiconductors HP, Optonica. Holland/ Korea : Phillips Japan : Hitachi Taiwan: Ligitek
8	Optical port	Optical port should be used to transfer the meter data to meter reading instrument. The mechanical construction of the port should be such to facilitate the data transfer easily. The Optical Port should not be adversely affected by influence of electromagnetic field, Static discharge.	USA: National Semiconductors HP Agilent Holland/Korea : Phillips Japan : Hitachi Taiwan: Ligitek

9	Power supply	The power supply should be with the Capabilities as per the relevant standards. It should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections	SMPS Type or better
10	Electronic components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes.	USA: National Semiconductors, Atmel, Philips, Taxas Instruments, Siemens WELWYN, VISHAY DRALORIC,YAGEO, KOA,R OHM,PHYCOMP,FA IRCHI LD,PHILIPS,VISHAY SEMICOND, TEXAS INSTRUMENT,EPCO S, OSRAM,INFINION,N ATIO NAL SEMICOND etc. Japan : Toshiba , Hitachi, Oki, AVZ or Ricon Korea; Samsung
12	Battery	Chargeable maintenance free guaranteed life of 10 years.	Varta, Tedirun, Sanyo or National, Panasonic, Renata
13	RTC & Micro controller.	The accuracy of RTC shall be as per relevant IEC/ IS standards.	USA : Philips, Dallas, ST, Xicor Atmel, Motorola, Microchip Japan : NEC or Oki. Taiwan :Prolific Technology Inc.
14	PCB	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm.	A class vendor

Note: The makes of components mentioned in tender specifications are only indicative. The bidder can utilize better or equivalent make of components. Details of components used in meter should be mentioned in Schedule:B of technical specifications. Same should also to be provide by the supplier at the time of Proto as well as Lot inspection. Same is to be attached with the inspection report by the supplier.

5.SAMPLING RATE AND DERIVATION OF BASIC MEASURABLE QUANTITIES:

The actual supply wave of related voltages and currents shall be sampled out at the rate of minimum 3000 samples per second and shall provide integrated values of each actual voltage and current (available on display in push button mode) while deriving actual basic active (cosine part measurable component) and reactive (sine part measurable component) energies (with respect to relevant voltage wave and current wave) even under presence of harmonics.

The meter shall have internal Real Time Clock with the back up of a Lithium maintenance free battery of minimum shelf life of Ten (10) years for operation of the time clock. The Real Time Clock shall be based on Quartz crystal timer so as to make it independent of line frequency variations.

6. QUANTITIES TO BE MEASURED, MONITORED AND MEMORISED:

6.A. The meter shall be capable of measuring and storing in the memory and displaying the following electrical quantities within specified limits of error for poly phase with balanced or unbalanced loads at all power factors. Apparent demand and energy shall be derived from active energy (cosine part recording arrangement) and reactive energy (sine part lagging and leading power factor recording arrangement) through vector summation of active energy and only lagging reactive electrical energies traversed for 30 minutes integration period.

The meter shall also be capable of measuring, monitoring and storing in the memory minimum FOUR (4) time zone (TOD) electrical quantities for pre-specified periods of the day. However, since at present the features of TOD energy measurement are required for four time zones only, provision shall be made so that the same can be programmed up to eight (8) zones through MRI/PC at site as and when required in the future.
The four time zones to be provided in the meter and its sequence is as under. In MRI data TOD energy and demand report should be available for Nos. of time zone programmed (Presently only 4 Nos. to be available in the MRI report)

Sr. No.	TOD Details	Timings	Total Hours in TOD
1.	TOD-1 (Peak)	07:00 Hrs. to 11:00 Hrs. Plus 18:00 Hrs. to 22:00 Hrs.	8
2.	TOD-2 (Night)	00:00 Hrs. to 06:00 Hrs. Plus 22:00 Hrs. to 24:00 Hrs.	8
3.	TOD-3 (Rest)	06:00 Hrs. to 07:00 Hrs	1
4.	TOD-4 (Off Peak)	11:00 Hrs. to 18:00 Hrs.	7

TOD timing shall be printed/pasted on plate/meter body in easily interpretable form.

6.A.1. Active energy: Total Forward Cumulative kWh energy.
6.A.2. Reactive energy: Cumulative KVARH lagging with respect to Active energy.
6.A.3. Apparent energy: Cumulative KVAH derived vectorically from lagging Reactive and Active energy.
6.A.4. Maximum Demand: Active MD KW demand derived from total forward cumulative active energy with integration period of 30 minutes.
6.A.5 High Resolution mode for Total KWH, Fundamental KWH, KVAH & KVARH(lag)

Recording of active energy (KWH) for billing purpose.

The Meter should record and display maximum demand in KW and Total forward KWH (i.e. Fundamental plus Harmonics energy)
It should measure and record cumulative KVAH energy also derived from vectorial summation of Total cumulative KWH (fundamental + harmonic energy) and cumulative KVARH energy (lag only).

Meter should also record KVA demand derived from total KVAH energy with integration period of 30 minutes.

The high resolution display having of minimum seven digit **(minimum two digits before decimal points & minimum Five digits after decimal points e.g. xx.xxxxx)** for Total KWH, Fundamental KWH, KVAH, KVARH (lag) shall be provided under mode–3 for the accuracy checking of meter in the field.

a) The meter shall have 3 modes for display. Display parameters in all 3 modes shall be as per Annexure-1 in following manner

MODE 1: Parameters of this mode should display on auto scrolling as well as manually up & down scrolling using push button. However,repeated parameters shall not display in push button mode.
MODE 2 & 3: Parameters of these modes should display manually up & down scrolling using push button

- Meter shall have separate push buttons for up and down scrolling
- MD reset button shall be exclusive for MD reset. Functional marking shall be provided for all push buttons

Last parameter should stay on display for five minutes after last press of push button, and then, display should automatically switch over to auto scrolling mode (Mode-1).
Display mode shall be changed by simultaneous pressing of up scroll and down scroll button for five seconds.
Mode-1, Mode-2 & Mode-3 header should also display at the time of Mode changing by Buttons.
In absence of power supply, display shall be available by push button.
Internal power source for the display should be such that in case of power failure, even for the period for six months display can be seen by push button and data can be retrieved.

6.B. The meter shall keep following quantities recorded and memorized in its Non Volatile memory chip forever, so that in event of failure/damage of the meter the last reading of billing quantities would not be lost.

Cumulative energies from the date of installation -
6.B.1. Total forward Cumulative KWH energy.
6.B.2. Cumulative KVARH lag
6.B.3. Cumulative KVAH energy.

7. SEALING OF THE METER:

Reliable sealing arrangement shall be provided with sealing screw to make the meter tamperproof and to avoid fiddling or tampering by unauthorized persons. For this, at least two (2) Nos. seals on meter body, two (2) No. seal on meter terminal cover, one (1) No. seal on communication port and one (1) No. seal on MD reset button (if such button is provided) shall be provided. All the seals shall be provided on front side only. Rear and in-side sealing arrangement shall not be accepted. The bidder in their offer shall explain the sealing arrangement. The sealing screw should be unidirectional and arrangement of sealing screw shall be as per standard practice with two holes at bottom and two holes at top of screw for sealing arrangement.

At least two sealing screws of Nickel plated steel shall be provided for proper fixing of meter cover. Each sealing screw shall have two independent sealing holes. Two holes should be provided in the head and Two in the bottom portion, so that two separate seals can be provided. The diameter of the hole shall be 2.0 mm and 1.5 mm for the head and bottom portion respectively. The length of the sealing screw shall be long enough to flush with the ground or any other sealing arrangement which will meet our requirement.

The supplier shall have to provide two polycarbonate Plastic seals on the meter body of each meter before dispatch of the meter. The plastic seal shall have embossing of the supplier's logo & sr. no. of seal. Sr. no. of seal is to be provided on both male & female part of the seal.

8. BOUGHT OUT ITEMS:

A detailed list of bought out items, which are used in the manufacture of the meter, shall be furnished indicating the name of firms from whom these items are procured. The bidder shall also give the details of quality assurance procedures followed by him in respect of the bought out items.

9. OUT PUT DEVICE:

The meter shall have a test output accessible from the front and be capable of being monitored with suitable testing equipment. The operation indicator must be visible from the front. Test output device shall be provided in the form of LED output device for KWH and KVARH measurement.

The relation between test output shall comply with the marking on the name plate or with the indication on display, if so provided in addition to details on name plate i.e. pulse per KWH/KVARH.

10.COMMUNICATION PORT:

The meter shall be provided with two ports for communication of the measured/ collected data as per guideline document enclosed in the annexure, i.e. a hardware port compatible with RS 232 specifications which shall be used for remote access through suitable Modem (GPRS/GSM/EDGE/CDMA/PSTN/LPR) and an Optical port complying with hardware specifications detailed in IEC-62056-21. This shall be used for local data downloading through a DLMS compliant HHU."

The meter shall be capable of executing instructions from base computer service center only after due authentication through protected two level pass word, for the following:

i) Change in integration period
ii) Change in automatic re-setting for billing data, date & time.
iii) Activation of TOD energy measurement OR Modifications in TOD timings if required in future.

The meter shall thereafter communicate above information while off-loading the data to computer through hand-held meter reading instrument (MRI) with either relevant billing quantities or relevant energy audit/load survey data.

11.MARKING OF METER:

The meter terminal marking and mounting arrangement shall be as per Indian Standard/IEC. The marking on every meter shall be in accordance with IS 14697/1999 or IEC.

The meter shall have name plate beneath the meter cover such that the name plate cannot be accessed without opening the meter cover and without breaking the seals of the meter cover and the name plate shall be marked indelibly. The name plate marking shall not fade with lapse of time.

The basic marking on the meter nameplate shall be as under:

- Manufacturer's name and trade mark
- Type designation
- Number of phases and wires
- Serial number
- Month and Year of manufacture
- Reference voltage
- Rated Current
- Principal unit(s) of measurement
- Meter constant (imp/kWh)
- 'BIS' Mark
- Accuracy Class of meter (class-0.5s)
- "Property of UGVCL."
- Purchase Order No. & date
- Guarantee period-
- Category of the meter and corresponding IS 14697:1999

Only one meter Sr. no which is provided by the UGVCL must be on name plate. Unique procedure of Meter Sr. no. having Alfa-numeric character will be decided by UGVCL and will be given at the time of placing Order so that 7 digit numeric part will appear on meter display and Alfa-numeric part will appear in BCS (MRI data) as well as on name plate.

12.CONNECTION DIAGRAM, PHASE SEQUENCE & TERMINAL MARKINGS:

The connection diagram of the meter shall be clearly shown in inside portion of the terminal cover & shall be of permanent nature. Meter terminals shall also be marked & these markings should appear in above diagram.

13.ELECTRICAL REQUIREMENTS:

13.1 SUPPLY SYSTEM :

Rated voltage (Vref)	3x240V-415 V(CT operated meters)
Rated current (Ib)	5 Amp. through current transformer
Max. rated current	200 % of Ib
Standard Frequency	50 Hz

13.2 POWER FACTOR RANGE:

The meter shall be suitable for full power factor range from zero (lagging) through unity to zero (leading).

13.3 POWER SUPPLY VARIATION:

The meter should be suitable for working with following supply system variations:-

Specified operating range	+20% to -30% of 240 V
Frequency	50 Hz +/-5% (As per standard)

For influence quantities like voltage variation, frequency variation, voltage unbalance etc. the limits of variation in percentage error shall be as per IS:14697/1999.

13.4 ACCURACY:
Class of accuracy of the meter shall be 0.5s,

13.5 POWER CONSUMPTION:

13.5.1
Voltage Circuit: The active and apparent power consumption in each voltage circuit including the power supply of meter at reference voltage, reference temperature and reference frequency shall not exceed 1.5 W & 10 VA i.e.as per the provision of IS-14697:1999 /IEC(latest amendment)

13.5.2
Current Circuit: The apparent power taken by each current circuit at basic current, reference frequency and reference temperature shall not exceed 1 VA i.e. as per the provision of IS-14697:1999 /IEC(latest amendment)

13.6 STARTING CURRENT:

The meter shall start registering the energy at 0.1% of Ib and unity power factor.

13.7 MAXIMUM CURRENT:

The rated maximum current for the meter shall be 10 Amp (200 % Ib) at which the meter purports to meet the accuracy requirement.

13.8 IMPULSE VOLTAGE:

The meter shall withstand impulse voltage at 10 KV. This is a special requirement of UGVCL. Test shall be carried out as per procedure defined in clause 12.7.6.2 of IS 14697:1999.

13.9 REPEATABILITY TEST:

The test shall be carried out at 5% Ib and Ib at UPF – six readings at the interval of 5 minutes. The difference between maximum and minimum error shall not be more than 0.25.The test shall be conducted on the three samples selected from the eight meters selected for accuracy test as per clause no. 11.7 of IS 14697.

13.10 SHORT TIME OVER CURRENT:

The meter should be able to carry a short time over current of 20 Imax. for 0.5 second (One half cycle) for meters connected through current transformer.

13.11 INITIAL START OF METER:

The meter should be fully functional within five seconds after rated voltage is applied to the meter terminal.

13.12 RUNNING WITH NO LOAD:

When the voltage is applied with no current flowing in the current circuit, the test output of the meter shall not produce more than one output count.

13.13: METER CONSTANT:

Relation between the test output and indication in the display shall comply with the marking on the name plate.

13.14: AC VOLTAGE:

The meter should pass AC voltage test of 2 KV and 4 KV for metal case and insulating material case respectively.

13.15 LIMITS OF ERROR & OTHER ACCURACY:

The meter should comply the requirement of limit of errors and other accuracy requirement as per IS 14697 (1999) and as per CBIP report No. 304.

14. SOFTWARE:

Software shall be supplied free of cost by the meter manufacturer and its nos. will be decided by the UGVCL.

The above software shall be suitable for the operating system of the associated UGVCL's computers:

(i) Software for reading the meter contents in the MRI.
(ii) Base Computer Software (BCS) for accepting data from MRI and down loading instructions from Base Compute to MRI. Windows based BCS for receiving data from CMRI and downloading instructions from BCS to CMRI. This BCS shall have, amongst other requirements and features and facilities described later in this specification, the facility to convert meter reading data into user definable ASCII file format so that it may be possible for the user to integrate the same with the user's billing data and process the selected data in desired manner. The report should be export to excel and PDF format.
(iii) The meter should be capable to communicate directly to Lap Top /Desktop computer. Any other special applications software and additional software not mentioned above but necessary for functioning of the system should also be supplied free of cost.

The above software shall be suitable for the operating system of the associated UGVCL's computers.

Windows based Base Computer Software (BCS) for receiving data from CMRI and downloading instructions from base computer software to CMRI. This BCS should have, amongst other requirements and features and facilities described later in this specification, the facility to convert meter reading data into user definable ASCII file format so that it may be possible for the user to integrate the same with the user's billing data and process the selected data in desired manner.

After successful downloading data either from the meter or MRI, Meter data should be automatic uploaded to BCS without any separate procedure to upload data. Meter List shall be shown on computer Display screen.
There shall be provision of filter for finding the particular meter Viz. one can find the meter on the basis of date, Month, Sr No, etc.

15.SALIENT FEATURES:

The meters shall have the following additional salient features.

15.1 The meter shall have provision to read in absence of power through an internal power source

15.2 The meter shall work accurately irrespective of phase sequence of the mains supply.

15.3 The meter shall remain powered up and functional in presence of any two wires.

15.4 The meter shall continue to record accurately as per prevailing electrical conditions even if the neutral of supply gets disconnected.

15.5 The meter shall record correct energy in case of current reversal of one or more phase.

15.6 The measurement by meter shall not get influenced by injection of AC Voltage/ Chopped signal/DC signal and Harmonics in any leads of the meter.

15.7 The potential link shall neither be provided external or internal. Link less terminal block shall be provided.

15.8 The meter should be programmed for both KVA MD and KW MD. However other programmable parameters should be made available as per IS 15959: 2011.

15.9 The meter shall record and display total forwarded energy including forwarded Harmonic energy in following conditions.

(a) Voltage and current both in phase
(b) Voltage and current both out phase
(c) Voltage in phase and current out phase
(d) Voltage out phase and current in phase

Above tests shall be carried out at Ref. voltage, 0.5 Imax and UPF with 10 % 5th harmonics in voltage and 40% 5th harmonics in current. In all above conditions, meter shall record total energy = 1.04 times fundamental energy.

15.10 The working of Meter under different magnetic influence condition is as under for Active energy.

a) Meter must be immune to the continuous D.C stray magnetic field of 67mT. Method for the testing & obtaining magnetic field should be as per CBIP 304 clause No 5.6.2.1, Table : 17 & its notes.
b) Meter must be immune to the A.C stray magnetic field of 0.5mT. Method for the testing & obtaining magnetic field should be as per CBIP 304 clause No 5.6.2.2 , Table : 17& its notes.

c) Meter should be immune to the continuous D.C abnormal magnetic of 0.27T.In case of if it is not immune than Meter should switch over to 150% Imax, UPF. Method for the testing & obtaining magnetic field should be as per CBIP 304 clause No 5.6.2.3, Table: 17 & its notes.

d) Meter should be immune to the A.C abnormal magnetic of 10mT.In case of if it is not immune than Meter should switch over to 150% Imax, UPF. Method for the testing & obtaining magnetic field should be as per CBIP 304 clause No 5.6.2.4, Table: 17 & its notes.

e) Meter should be immune to the A.C abnormal magnetic of 0.2T.In case of if it is not immune than Meter should switch over to 150% Imax, UPF. Method for the testing & obtaining magnetic field should be as per CBIP 304 clause No 5.6.2.4, Table: 17 & its notes.

f) Meter should be immune to permanent magnet of 0.5 T of minimum size 70 x70 x 50 mm. In case of if it is not immune than Meter should switch over to 150% Imax, UPF. Method for the testing & obtaining magnetic field should be as per CBIP 304 clause No 5.6.2.3, Table: 17 & its notes.

16.DISPLAY OF MEASURED VALUES:

16.1. The measured values shall be displayed on SEVEN segment LCD with minimum SEVEN digits (each digit having equal height of minimum 8 mm).

The display shall be permanently backlit LCD. It should be visible in daylight. The decimal units shall not be displayed for Cumulative kWh in auto scroll mode. However it shall be displayed in push button mode for high resolution display for testing. In case of power failure, display should be made available by internal battery.

The meters shall have bright LCD Electronic display with back lit. The back lit should not glow during power off condition. The LCD shall be of STN (super twisted nematic type) constructing suitably for temperature withstand of 80ºC (storage) & 65ºC (operation) i.e. (i) When the meter is placed over at a constant temperature of 65ºC for a period of 30 minutes, the character of LCD should not deform. (ii) After keeping the meter at a constant temperature of 80ºC for a period of 30 minutes and when restores at normal temperature, LCD display should work satisfactorily. The LCD display should have a wide viewing angle of 120º and up to one meter distance, for clear visibility of the display of the meter reading at distance. Large viewing area with large display icons is preferred. The registered parameters shall not be affected by loss of power. The display shall not be affected by electrical and magnetic disturbances. Dot Matrix type LCD display is not acceptable.

If display having seven Digits than KWH, KVARh lag, lead & KVAh reading shall be XXXXXX.X (6 +1 decimal points)

If display having eight Digit than KWH, KVARh lag, lead & KVAh reading shall be XXXXXXX.X (7 +1 decimal points)

For high resolution display should be minimum xx.xxxx

16.2. The data shall be stored in non-volatile memory (NVM). The NVM shall retain data for a period of not less than 10 years under un-powered condition.

16.3. It shall be possible to easily identify the displayed parameters through symbols/ legend on the meter display itself.

16.4. In case of multiple values presented by a single display, it shall be possible to identify each displayed value/parameter through separate symbol/legend to be made available on the display itself.

17.METER SERIAL NUMBER:

In addition to providing serial number of the meter on meter display and meter name plate, the same shall also be programmed into meter memory for identification through CMRI/meter reading printout.

18.MAXIMUM DEMAND (MD) REGISTRATION:

The meter shall monitor and calculate the average demand in KW established during pre-specified integration period set and record/display the maximum registered value and the same shall be stored along with date and time when it occurred in the meter memory. The rising demand under the current integration period shall be displayed along with elapsed time. The **integration period shall be capable of making adjustment with duration of 15 or 30 minutes with due authentication.**

19.MAXIMUM DEMAND RESET:

The meter shall have the following maximum demand resetting arrangements:

(a) Automatic resetting at the end of pre-specified date of every calendar month (e.g. 00.00 hours on first day of every month).
(b) A provision for revising the resetting cycle for modifying the date and time of automatic resetting through base computer service center or via hand-held meter reading instrument only after using protected pass word through authenticated BCS should be available.
(c) Provision for Manual Resetting of the monthly Max Demand with adequate sealing arrangement must also be made.

In all MD resets (Automatic/Manual), no. of counts shall be increased on every reset.

20.LOAD SURVEY CAPABILITY & BILLING POINT REQUIREMENTS:

Meter shall record load survey of minimum 90 days (Power-On days) for KWH,KVAH and KW,KVA with integration period of 30 minutes. It shall be possible to select either demand or energy view at the BCS end. However, Supplier may provide more Nos. of parameters including at least KWH & KVAH in load survey report. There shall be provision of selection of either single parameter or more Nos. of parameters in software. There shall also be provision of particular date /day selection in software. There shall be provision to see the LS report on daily basis, weekly basis or monthly basis.

The load survey data shall be available in the form of bar charts as well as in spread sheets. The BCS shall have the facility to give complete load survey data both in numeric and graphic form.

The load survey data must be available in FIFO manner (First In First Out)

It shall be possible to retrieve these data via communication port on to hand-held meter reading instrument (MRI) and it shall be possible to off load these data on to IBM compatible computer and get complete details of the load/demand pattern in terms of KW/KWh both in numeric data form and in graphic form for all the 24 hours a day divided as per the pre-set integration period of 30 minutes in each individual case. Necessary software for this purpose must be provided by the supplier. The total time in minutes to be taken by meter for retrieval of all above data shall have to be clearly indicated in offer.

TOD-Zone wise Energy and demand values and its consumption for last **twelve** resets should be available with date & time.

21.SELF DIAGNOSTIC FEATURE:

The meter shall be capable of performing complete self-diagnostic check to monitor the circuits for any malfunctioning to ensure integrity of date memory location all the time. The meter shall provide information for unsatisfactory/non-functioning/malfunctioning of the following.

a. Time and date
b. All display segments as per the requirement
c. Real Time Clock (RTC)
d. Non Volatile Memory (NVM)

If possible, the details of malfunctioning shall be recorded in the meter memory.

22.TAMPER AND FRAUD PROTECTION:

The meter shall have tamper logic i.e. features to detect and logging of the occurrence and restoration of tamper as per Annexure-II.

The meter must provide summary Report for logged tamper events occurred with duration in BCS data.

All tamper data separately for each event shall be made available with its time of occurrence and time of restoration and in no case shall be made available to reset to ZERO. The bidder must also specify Nos. of tamper events that the meter is capable to store.

Additional features any in their meter may also be highlighted.

A) Snap Shots (numerical values) of voltage, current, power factor and energy (KWH) readings as well as the date and time of logging of the occurrence and restoration of tamper events, subject to meter-memory space as described herein under, should be logged in the meter memory and available for retrieving through the meter's optical port via CMRI and downloading to the BCS.

B) Minimum of total **four hundred (400)** events (occurrence and restoration) of all types of tamper with date and time shall be available in compartment in the meter memory on first in, first out basis.
Compartments are classified as under.

1. For voltage related event- 150 events (occurrence and restoration)
2. For current related event- 150 events (occurrence and restoration)
3. For other remaining events- 100 events (occurrence and restoration)

Moreover, minimum 25 power fail events with duration are required in BCS data.

If the cover open tamper occur than, on Display, C-OPEN should only to be displayed. Display should stuck (i.e. No Scrolling of any parameters.). However meter should record energy continuously & KWH reading shall be access/available by use of Push button. After five minutes again Display should stuck & C-OPEN should only to be displayed on Display.

Snap shot value for occurrence and restoration of event should be available together in the report. It shall be possible to retrieve the tamper data along with all related snap shots data through the meter's optical port with the help of CMRI and download the same to the BCS where it shall be available for viewing. All this information shall be available in simple and easily understandable format.

The threshold values for voltage, current and P.F. etc. for the purpose of logging occurrence and restoration of various types of tamper will be as per Annexure-II attached herewith. The supplier shall give their confirmation for these values in their offer.

25.ACCURACY REQUIREMENT:

The accuracy of parameters measured by meters shall be tested in accordance with the relevant standards described in clause 2.0 of this specification.

The test shall be carried out for balanced load and unbalanced current load i.e. individual phase.

26.ELECTRICAL REQUIREMENT:

The electrical requirement of meters shall be as specified in the relevant standards described in clause 2.0 of this specification.

27.ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE REQUIREMENT:

The meter shall meet EMI/EMC requirements as specified in the relevant standards described in Clause 2.0 of this specification.

ESD withstand limit shall be minimum 35 KV. The meter should be preferably immune to any abnormal frequency/voltage device/jammer. Meter should not stop recording energy under such condition.

Application of abnormal voltage/frequency:

The accuracy of the meter should not be affected with the application of abnormal voltage/frequency such as spark discharge of approximately 35 KV in any/all of the following manner for total 10 minutes:

i) On any of the phases or neutral terminals OR without connecting neutral.
ii) On any connecting wires of the meter.
iii) Voltage discharge with 0-10 mm spark gap.
iv) At any place in load/supply circuit.
v) Spark on meter body.

However, during the test, function of the meter shall be verified by visual inspection of pulse output. KWH should not be changed during the test & shall be verified before and after test.

28.MECHANICAL REQUIREMENT:

The meter shall meet the mechanical requirements as specified in the relevant standards described in clause 2.0 of this specification.

29.CLIMATIC INFLUENCE REQUIREMENT:

The meter shall meet Dry Heat/Cold/Damp heat cycle test requirement as per the relevant standards described in clause 2.0 of this specification.

30.MINIMUM TESTING FACILITIES:

The Bidder shall have the necessary minimum testing facilities for carrying out the following tests:

1. AC voltage test
2. Insulation resistance test
3. Test of limits of errors
4. Test of meter constant
5. Test of starting condition
6. Test of no load condition
7. Repeatability of error test
8. Test of power consumption
9. Tamper conditions - as per this specifications
10. ESD Test for 35 KV as per clause no.27
11. Effect of harmonics.(third & fifth)
12. DC immunity test(As per IS 14697)
13. Voltage and frequency variation test.
14. AC, DC and permanent magnet test.

The manufacturer shall have duly calibrated ERS meter of Class 0.1 accuracy or better.

Manufacturer also shall possess automatic computerized meter test bench system for carrying out the relevant routine/acceptance tests as well as facility to generate test reports for each and every meter tested.

31.TESTS:

31.1 Type Tests:

The bidder should submit Type Test Reports for all tests as per schedule of IS –14697/99 for the tests having been conducted on the sample meter, not prior to 3 (Three) years before the issue of tender, from reputed third party Govt. approved laboratory viz. CPRI, ERTL, ETDC, NPL, ERDA only. All the type tests must have been conducted within One year's tenure and on the sample as specified under cl. No: 12.2.2.1 of IS-14697-1999. Offers without the Type Test reports shall be rejected. The type test report submitted shall be of the same type and design of the meter offered. Please note that the bidder in case of supplier having own NABL accredited lab, the type test certificate furnished with tender from such lab shall not be accepted.

31.2 Tender Samples:

The bidder shall submit 3 (Three) nos. samples of meters **(either 100/5 A or 200/5 A) without MRI** at the time of offer. Offer without samples will not be scrutinized on the strength of GTP. The samples are to be delivered to The Deputy Engineer, Regional Store Office – Uttar Gujarat Vij Company Ltd, Visnagar Road – Mehsana -384001.

Bidder has to submit the tender samples with DLMS as per IS 15959 & Display parameters as per Annexure -1 and tampers as per Annexure – 2.
The samples shall be tested at ERDA/CPRI/NABL accredited lab for following tests. If the sample found failed in any of the test, the offer of that bidder shall be considered disqualified. However, the decision of the company shall be final and binding to all the bidders.

List of tests to be conducted on tender samples.

1. AC high voltage test method as per IS but shall be taken at 4 KV for one minute.
2. Insulation resistance test
3. Impulse voltage test at 10 KV
4. 35 KV Test as per Cl no. 27 of Specification
5. AC, DC and permanent magnet test as per CBIP publication no. 304 for active energy only
6. Test for DC injection in both phase and neutral
7. Dry heat test
8. Test for total energy i.e. fundamental + harmonics as per Cl. No.15.9 of specification.
9. Test for influence of quantities i.e .Voltage and frequency variation test and 10% of 3rd harmonics
10. Test of no load condition
11. Test of starting condition at 0.1 % of basic current as per specification
12. Test for limit of error
13. Interpretation of test results, if required
14. Test for meter constant
15. Test of repeatability of error
16. Test of power consumption
17. Test of Short time over current test
18. Test of terminals for withstanding 150 % I max as per Specification
19. Verification of Display parameters and Functional requirement
20. Tamper condition tests as per Annexure II

31.3 Prototype Samples:

The supplier shall also have to manufacture 3 nos. of prototype sample meters complying to all above technical specification, type, rating, functional requirements, tamper features, display design etc. and shall have to offer for inspection within 30 days from the date of placement of LOI and before commencement of bulk supply.

During the proto type sample following tests shall be carried out as per the specifications at supplier's works.

1. AC high voltage test method as per IS but shall be taken at 4 KV for one minute
2. Insulation resistance test
3. Test of limits of errors for active & reactive with balance & unbalance load including 0.25 lag and 0.5 lead pf
4. Test of meter constant
5. Test of starting condition
6. Test of no load condition
7. Repeatability of error test
8. Test of power consumption in voltage and current circuit.
9. ESD Test for 35 KV as per specification.

10. Test for total forward energy (Fundamental + Harmonics) in the Presence of Harmonics in Voltage and Current Circuits as per specification clause no. 15.9
11. DC and even harmonics in ac current circuit - (DC immunity)-As per IS 14697
12. Test of effect of Influence quantities as per IS 14697.
13. AC, DC and permanent magnet test as per CBIP publication no. 304 for active energy only.
14. Test for terminals and screw at 150% Imax for two hours.
15. Verification of Tamper conditions - as per Annexure-II
16. Verification of display parameters as per Annexure-I
17. Physical verification of meter as per specification including sealing as per tender sample.

One proto type meter will be tested at CPRI, Bangalore/Bhopal for conformity of IS:15959 for DLMS common protocol. Only after successful testing and passing proto meters at supplier works and CPRI, manufacturer should start manufacturing of bulk supply order quantities.
Further, purchaser reserves all right to get any meter out of any lots offered be tested at CPRI, for conformance of common protocol with IS 15959 : 2011. All expenses i.e. transportation and testing of meter at CPRI Bangalore/Bhopal in respect of proto meter shall have to be borne by the supplier.

The bulk manufacturing must be commenced only after confirmation from UGVCL authority. Three no. of prototype samples prepared as above shall have to be preserved till the completion of the supply of last lot.
The supplier shall also have to offer one no. of MRI for functional testing and verifications /testing of related software.

31.4 Routine Tests
All routine tests as stipulated in the relevant standards shall be carried out and routine test-certificates/reports shall be submitted along with inspection call letter in the form of composite disk (CD) and on the CD, A/T No. serial no. of meters to be offered etc. shall be provided with sticker pasted on the CD, to the purchaser for approval and also placed inside individual meter packing.

31.5 Acceptance Tests
Following acceptance tests as stipulated in the relevant standards and as per specification shall be carried out by the supplier in the presence of the purchaser's representative.

1. Insulation resistance test as per IS
2. AC high voltage test method as per IS but shall be taken at 4 KV for one minute.
3. 35 KV Test as per Cl no. 27 of Specification
4. Test for influence of AC / DC magnetic field as per CBIP 304
5. Test for DC injection in both phase and neutral
6. Test for total energy i.e. fundamental + harmonics as per Cl. No.15.9 of specification.
7. Test for influence of quantities i.e .Voltage and frequency variation test and 10% of 3rd harmonics
8. Test of no load condition
9. Test of starting condition at 0.1 % of basic current
10. Test for limit of error for active & reactive with balance & unbalance load.

11. Interpretation of test results, if required
12. Test for meter constant
13. Test of repeatability of error
14. Test of power consumption
15. Test of terminals for withstanding 150 % I max for two hours
16. Verification of Display parameters and Functional requirement
17. Tamper condition tests as per Annexure II

The meter should pass all above acceptance tests during inspection. If the facility for any of the tests are not available at supplier's works, the testing shall be arranged at any of the NABL approved lab. viz, ERDA, NPL, ETDC, ERTL, CPRI only and for such tests all the expenditures i.e. test charges etc. shall have to be borne by the supplier.

31.6. AUDIT TESTING :

From any dispatched lot, eight (8) nos. of meters shall be randomly selected jointly with supplier & sent for audit testing at any NABL Lab. decided by UGVCL & on receipt of test reports acceptability of lot will be decided. Following tests are to be carried out during the audit testing.

1. AC high voltage test
2. Insulation resistance test
3. Test of limits of errors for active & reactive with balance & unbalance load.
4. Test of meter constant
5. Test of starting condition
6. Test of no load condition
7. Repeatability of error test
8. Test of power consumption in voltage and current circuit.
9. Test for total forward energy (Fundamental + Harmonics) in the Presence of Harmonics in Voltage and Current Circuits as per specification clause no. 15.9
10. Test of effect of Influence quantities
11. AC, DC and permanent magnet test as per CBIP publication no. 304.
12. Verification of Tamper conditions - as per Annexure II
13. Verification of display parameters as per Annexure I

32.INSPECTION:

The purchaser may carry out the inspection at any stage of manufacturing. The manufacturer shall grant access to the purchase's representative at a reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing the meters in accordance with the specification and shall not prevent subsequent rejection if the meters are found to be defective.

All acceptance tests and inspection shall be made at the place of manufacturer works unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase. The bidder shall offer the inspector representing the purchaser all responsible facilities without charge, to satisfy him that the equipment is being furnished in accordance with this specification.

The supplier shall keep the purchaser informed in advance, about the manufacturing program so that arrangement can be made for inspection.

In case of non availability of meter during the visit of inspection of the lot offered, the visit shall be considered as unfruitful visit and all charges of this visit shall be deducted from the bill of the supplier.

The purchaser reserves the right to carry out type tests of any meter selected from the lot/meter received at stores of UGVCL.

33.QUALITY ASSURANCE PLAN:

33.1 The bidder shall invariably furnish the following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of material offered.

1.The structure of organization.
2.The duties and responsibilities assigned to staff ensuring quality of work.
3.The system of purchasing, taking delivery and verification of materials.
4.The system of ensuring quality of workmanship.
5.The quality assurance arrangement shall confirm to relevant requirements of ISO : 9001/9002 as applicable.
6.Statement giving list of important raw materials names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in presence of Bidder's representative, copies of test certificates etc.
7.Information and copies of test certificates as above in receipt of bought out accessories.
8.List of manufacturing facilities available.
9.Level of automation achieved and lists of area where manual processing exists.
10. List of area in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
11.List of testing equipment available with the bidder for final testing equipments specified and test plant limitation. If any vis-a-vis the type, special acceptance and routine tests specified in the relevant standards, these limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

33.2 The offer will be accepted only from the original manufacturer. The manufacturer must be having at least five years experience of manufacturing and operation of similar type of tri vector meters.

33.3 BIS MARK-

The offered meter shall be ISI marked and bidder shall have to furnish valid BIS license for offered meters along with bid. Manufacturer having ISO:9001/9002 shall be preferred.

34.GUARANTEE:

The meter shall be guaranteed for the period of five years from the date of commissioning or five and half year from the date of delivery whichever is earlier. The meters found defective within above guarantee period shall be replaced/repaired by the supplier free of cost. **If defective meters are not replaced/repaired within one month from the date of the receipt of the intimation, UGVCL shall recover an equivalent amount plus 15% supervision charges from any of the bills. After intimation from the any UGVCL offices regarding collection of defective meters, same are to be collected within fifteen days invariably. Failing in this, suitable penalty may imposed by UGVCL.**

35.PACKING:

The meters shall be suitably packed in order to avoid damage or disturbance during transit or handling. Each meter may be suitably packed in the first instance to prevent ingress of moisture and dust and then placed in a cushioned carton of a suitable material to prevent damage due to shocks during transit.
User manual to be provided with each master cartoon. Hard copy of Routine test certificate is to be provided with individual meter.

36.SERVICES:
The bidder shall provide following services:

a)Services free of cost during guarantee period.
b)To train UGVCL staff for installation and handling of these meters.
c)To assist UGVCL lab staff to install, calibration, checking etc.
d)To assist the UGVCL staff for taking MRI reading, theft wrapped meter analysis etc. at free of cost.
e) To assist the UGVCL staff for installing, using and operation of software.

SCHEDULE-A

GUARANTEED TECHNICAL PARTICULARS-(GTP)

SR. NO	DESCRIPTION	AS PER UGVCL'S REQUIREMENT	AS OFFERED BY PARTY
1.	Type of meter i)Basic current (A) ii)Maximum current	LT CT Meter Ib : 5 Amps. through CT Imax : 10 Amps.	
2	Standards to which the meter conform	All standards as mentioned in clause no. 2 of specifications	
3	Overload capacity	200% of Ib	
4	Dynamic range	0.1% to 200% of Ib	
5	Power supply variation (i)Specified operational range (ii)Limit range of operation (iii) Frequency	 0.7 to 1.2 V ref. 0.7 to 1.2 V ref. 50 HZ ±5%	
6.	Accuracy class	Class 0.5s	
7.	P.F. Range	Zero lag –unity-Zero lead.	
8.	Variation of voltage at which meter functions normally	+20% to –30% of Vref.	
9.	Power Consumption per phase (i)Voltage circuit (ii)current circuit	To be specified by bidder	
10.	Minimum starting current of the meter (% Ib)	0.1% of Ib	
11	Impulse voltage	10 KV	
12.	Display parameters as per Annexure-I	To be confirmed	
13.	Operational indication LED	To be provided	
14.	(a)Material for base/terminal block (b)Material for meter cover/terminal cover	Transparent poly carbonate – LEXAN-503R 10% glass filled nontransparent poly carbonate –LEXAN-943A	
15.	a)Meter terminal block having sealable extended terminal cover b) No. of seals to be Provided c) Connection diagram inside the terminal cover d) Maximum safe current the terminals and screws shall carry	To be provided 2 nos. on meter body, 2 nos. on terminal cover, 1 no on optical port, 1 no on MD reset button To be Provided. 150% of Imax for 2 hours	
16.	Communication port	To be provided	
17.	REAL Time Clock with back up battery Life of battery	To be provided 10 Years (minimum)	
18.	Non volatile memory retention time in absence of power	To be specified by bidder.	

Signature of Tenderer Company's Round Seal Date: Place:

19.	Memory capacity (KB)	To be specified by party	
20.	Tamper and fraud provisions	To be provided as per Annexure II	
21.	SALIENT FEATURES (1)Meter shall have provision to read in the absence of power (2)Meter shall work accurately irrespective of phase sequence of the main supply. (3)Meter shall remain powered up and functional in presence of two wires (4)Meter shall record accurately even if neutral is disconnected (5)Meter shall record correct energy in case of current reversal of one or more phases (6)Measurement by meter shall not get influenced by injection of AC voltage/chopped signal/DC signal & harmonics (7)Meter shall register accurate energy even if load is drawn partially or fully through local earth. (8) Meter should record and display MD in KW as well as KVA for 30 minute integration period (9) Meter should record and display TOD energy. However, TOD MD in MRI report should be available.	 To be provided To be provided To be provided To be provided To be provided To be provided To be provided To be provided	
22.	MD reset	Auto as well as manual. (Separate/exclusive button to be provided for MD reset)	
23.	Self diagnostic feature	To be provided	
24.	Load Survey in graphical as well as in tabular form	minimum RTC, KWH & KVAH parameters(energy and demand) for 90 days with 30 minute integration period in FIFO Manner.	
25.	Snap Shot Facility	Voltage, current, power factor, KWH with date & time of	

		occurrence & restoration of tamper event.	
26.	No. of tamper events	Minimum 400	
	TESTS		
27.	Routine tests	As per IS14697 and specification	
28.	Acceptance tests	As per IS 14697 and as per UGVCL requirement	
29.	Type tests	To be submitted	
30.	Testing facilities	Fully Automatic test bench as per cl. no 30 of this specification	
31.	BIS license	To be submitted-BIS NO & date of validation to be mentioned.	
32.	ISO 9001/9002	ISO No & validity is to be specified.	
33.	Guarantee	5 Years from the date of commissioning or 5½ years from the date of delivery.	
34.	After services as per Cl. No.36	To be confirmed	

SCHEDULE – B

SOURCE OF MATERIAL AND PLACES OF MANUFACTURING, TESTING AND INSPECTION

Sr. No	Item part	Name of manufacturer	Place of manufacturer	Place of testing and inspection	Source of procurement of material not manufactured
1	Current Transformers				
2	Measurement Chips				
3	Quartz Crystal				
4	Memory chips				
5	Display modules				
6	Communication Modules				
7	Optical port				
8	Power supply				
9	Electronic components				
10	Battery				
11	RTC & Micro controller.				
12	PCB				

SIGNATURE OF BIDDER
NAME
DESIGNATION

ANNEXURE – I

DISPLAY PARAMETERS FOR 3-PHASE 4-WIRE LT CT OPERATED STATIC ENERGY METER

(TO BE PROVIDED IN FOLLOWING SEQUENCE)

Mode : 1 (Auto Scroll)	**Parameters of this mode should display on auto scrolling as well as manually up & down scrolling using push button (as mentioned in manual scrolling i.e. except repeated parameters)**	
Sequence	Parameter	Notation
1	**Display check**	- - - - - - -
1A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
1B	24hrs. total reactive energy	TC Kvarh lg
1C	Cumulative MD	CMD ----------Kw
2	**Sr. No. of Meters**	**UTP**
2A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
2B	24hrs. total reactive energy	TC Kvarh lg
2C	Cumulative MD	CMD ----------Kw
3	**CT Ratio**	
3A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
3B	24hrs. total reactive energy	TC Kvarh lg
3C	Cumulative MD	CMD ----------Kw
4	**RTC date & time**	
4A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
4B	24hrs. total reactive energy	TC Kvarh lg
4C	Cumulative MD	CMD ----------Kw
5	**R- Phase Voltage**	**V1**
5A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
5B	24hrs. total reactive energy	TC Kvarh lg
5C	Cumulative MD	CMD ----------Kw
6	**Y- Phase Voltage**	**V2**
6A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
6B	24hrs. total reactive energy	TC Kvarh lg
6C	Cumulative MD	CMD ----------Kw
7	**B- Phase Voltage**	**V3**
7A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
7B	24hrs. total reactive energy	TC Kvarh lg
7C	Cumulative MD	CMD ----------Kw
8	**R- Phase Line Current**	**I1**
8A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh

Signature of Tenderer Company's Round Seal Date: Place:

8B	24hrs. total reactive energy	TC Kvarh lg
8C	Cumulative MD	CMD ----------Kw
9	**Y- Phase Line Current**	**I2**
9A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
9B	24hrs. total reactive energy	TC Kvarh lg
9C	Cumulative MD	CMD ----------Kw
10	**B- Phase Line Current**	**I3**
10A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
10B	24hrs. total reactive energy	TC Kvarh lg
10C	Cumulative MD	CMD ----------Kw
11	**Inst. Total P.F. (Avg. of 3Ph.)**	**Pr.PF.**
11A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
11B	24hrs. total reactive energy	TC Kvarh lg
11C	Cumulative MD	MD ----------Kw
12	**Inst. Total active power**	**Pr.Kw.**
12A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
12B	24hrs. total reactive energy	TC Kvarh lg
12C	Cumulative MD	CMD ----------Kw
13	**Rising demand in KW with elapse time**	
13A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
13B	24hrs. total reactive energy	TC Kvarh lg
13C	Cumulative MD	CMD ----------Kw
14	**KW-MD of last billing period i.e. billing MD of 24hours recorded between last two resets**	**BMD ----------Kw**
14A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
14B	24hrs. total reactive energy	TC Kvarh lg
14C	Cumulative MD	CMD ----------Kw
15	**MD KW for Present Billing Period (After last reset)**	**RMD ------ Kw.**
15A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
15B	24hrs. total reactive energy	TC Kvarh lg
15C	Cumulative MD	CMD ----------Kw
16	**24hrs. apparent energy derived from Vectorial summation of total (fund+ Harm.) active energy and reactive (lag only) energy**	**TC Kvah**
16A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
16B	24hrs. total reactive energy	TC Kvarh lg
16C	Cumulative MD	CMD ----------Kw

17	**Cumm KWH for Peak hours (Zone1)**	**T1C Kwh**
17A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
17B	24hrs. total reactive energy	TC Kvarh lg
17C	Cumulative MD	CMD ----------Kw
18	**Cumm. KWH for Night hours (Zone2)**	**T2C Kwh**
18A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
18B	24hrs. total reactive energy	TC Kvarh lg
18C	Cumulative MD	CMD ----------Kw
19	**Cumm KWH for Rest hours (Zone3)**	**T3C K wh**
19A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
19B	24hrs. total reactive energy	TC Kvarh lg
19C	Cumulative MD	CMD ----------Kw
20	**Cumm KWH for off Peak hours (Zone4)**	**T4C K wh**
20A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
20B	24hrs. total reactive energy	TC Kvarh lg
20C	Cumulative MD	CMD ----------Kw
21	**MD KW between last two resets - Peak Hours (Zone-1)**	**T1 BMD**
21A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
21B	24hrs. total reactive energy	TC Kvarh lg
21C	Cumulative MD	CMD ----------Kw
22	**MD KW between last two resets - Night Hours (Zone-2)**	**T2 BMD**
22A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
22B	24hrs. total reactive energy	TC Kvarh lg
22C	Cumulative MD	CMD ----------Kw
26	**MD KW between last two resets - Rest Hours (Zone-3)**	**T3 BMD**
26A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
26B	24hrs. total reactive energy	TC Kvarh lg
26C	Cumulative MD	CMD ----------Kw
27	**MD KW between last two resets - Off Peak Hours (Zone-4)**	**T4 BMD**
27A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
27B	24hrs. total reactive energy	TC Kvarh lg
27C	Cumulative MD	CMD ----------Kw
28	**MD KW for Present Billing - Peak Hours (Zone -1)**	**T1RMD ------ Kw**
28A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
28B	24hrs. total reactive energy	TC Kvarh lg

28C	Cumulative MD	CMD ----------Kw
29	**MD KW for Present Billing - Night Hours (Zone -2)**	**T2RMD ------ Kw**
29A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
29B	24hrs. total reactive energy	TC Kvarh lg
29C	Cumulative MD	CMD ----------Kw
30	**MD KW for Present Billing - Rest Hours (Zone -3)**	**T3RMD ------ Kw**
30A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
30B	24hrs. total reactive energy	TC Kvarh lg
30C	Cumulative MD	CMD ----------Kw
31	**MD KW for Present Billing - Off Peak Hours (Zone -4)**	**T4RMD ------ Kw**
31A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
31B	24hrs. total reactive energy	TC Kvarh lg
31C	Cumulative MD	CMD ----------Kw
32	**MD Reset Count**	
32A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
32B	24hrs. total reactive energy	TC Kvarh lg
32C	Cumulative MD	CMD ----------Kw
33	**Voltage failure count phase wise**	
33A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
33B	24hrs. total reactive energy	TC Kvarh lg
33C	Cumulative MD	CMD ----------Kw
34	**Current failure count phase wise**	
34A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
34B	24hrs. total reactive energy	TC Kvarh lg
34C	Cumulative MD	CMD ----------Kw
35	**Voltage unbalance Count**	
35A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
35B	24hrs. total reactive energy	TC Kvarh lg
35C	Cumulative MD	CMD ----------Kw
36	**Current unbalance Count**	
36A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
36B	24hrs. total reactive energy	TC Kvarh lg
36C	Cumulative MD	CMD ----------Kw
37	**Current reversal count- phase wise**	
37A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh

37B	24hrs. total reactive energy	TC Kvarh lg
37C	Cumulative MD	CMD ----------Kw
38	**Magnet tamper count.**	
38A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
38B	24hrs. total reactive energy	TC Kvarh lg
38C	Cumulative MD	CMD ----------Kw
39	**Total Tamper Count**	
39A	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
39B	24hrs. total reactive energy	TC Kvarh lg
39C	Cumulative MD	CMD ----------Kw

Note :

- **Each parameter shall be displayed for 10 seconds.**
- **The persistent tamper event indication/icon shall be displayed in auto mode.**

Mode : 1 (Manual Scroll)	**Parameters of this mode should display manually on up & down scrolling using push button**	
Sequence	Parameter	Notation
1	**Display check**	**- - - - - - -**
2	**Sr. No. of Meters**	**UTP**
3	**CT Ratio**	
4	**RTC date & time**	
5	**R- Phase Voltage**	**V1**
6	**Y- Phase Voltage**	**V2**
7	**B- Phase Voltage**	**V3**
8	**R- Phase Line Current**	**I1**
9	**Y- Phase Line Current**	**I2**
10	**B- Phase Line Current**	**I3**
11	**Inst. P.F. (Avg. of 3Ph.)**	**Pr.PF.**
12	**Inst. Total active power**	**Pr.Kw.**
13	**Rising demand in KW with elapse time**	
14	**24hrs. total active energy (fundamental+ harmonics)**	**TC Kwh**
15	**24hrs. total reactive energy**	**TC Kvarh lg**
16	**24hrs. apparent energy derived from Vectorial summation of total (fund+ Harm.) active energy and reactive (lag only) energy**	**TC Kvah**
17	**MD KW for Present Billing Period (After last reset)**	**RMD ------ Kw.**

18	**KW-MD of last billing period i.e. billing MD of 24hours recorded between last two resets**	**BMD ----------Kw**
19	**Cumulative MD**	**CMD ----------Kw**
20	**Cumm KWH for Peak hours (Zone1)**	**T1C Kwh**
21	**Cumm. KWH for Night hours (Zone2)**	**T2C Kwh**
22	**Cumm KWH for Rest hours (Zone3)**	**T3C K wh**
26	**Cumm KWH for off Peak hours (Zone4)**	**T4C K wh**
27	**MD KW between last two resets – Peak Hours (Zone-1)**	**T1 BMD**
28	**MD KW between last two resets – Night Hours (Zone-2)**	**T2 BMD**
29	**MD KW between last two resets – Rest Hours (Zone-3)**	**T3 BMD**
30	**MD KW between last two resets – Off Peak Hours (Zone-4)**	**T4 BMD**
31	**MD KW for Present Billing – Peak Hours (Zone -1)**	**T1RMD ------ Kw**
32	**MD KW for Present Billing – Night Hours (Zone -2)**	**T2RMD ------ Kw**
33	**MD KW for Present Billing – Rest Hours (Zone -3)**	**T3RMD ------ Kw**
34	**MD KW for Present Billing – Off Peak Hours (Zone -4)**	**T4RMD ------ Kw**
35	**MD Reset Count**	
36	**Voltage failure count - phase wise**	
37	**Current failure count - phase wise**	
38	**Voltage unbalance Count**	
39	**Current unbalance Count**	
40	**Current reversal count- phase wise**	
41	**Magnet tamper count.**	
42	**Total Tamper Count**	

Mode : 2	**Parameters of this mode should display manually up & down scrolling using push button under Mode-2**	
Sequence	Parameter	Notation
1	Inst. P.F.Phase 1	P.F1
2	Inst. P.F.Phase 2	P.F2
3	Inst. P.F.Phase 3	P.F3
4	Inst. Kva	Pr Kva
5	Inst. Kvar.	Pr Kvar
6	Phase Sequence - Voltage	
7	Phase Sequence -Current	
8	Frequency	Hz
9	Cumm. KVARH (Lead)	
10	MD Kvar after last billing – (24 Hrs)	MD Kvar

11	Cumm. KVARH-lag for Peak Hours (Zone-1)	Kvarh1
12	Cumm KVARH-lag for Night Hours (Zone-2)	Kvarh2
13	Cumm KVARH-lag for Rest Hours (Zone-3)	Kvarh3
14	Cumm KVARH-lag for Off Peak Hours (Zone-4)	Kvarh4
15	Cumm. KVAH for Peak Hours (Zone-1)	Kvah1
16	Cumm KVAH for Night Hours (Zone-2)	Kvah2
17	Cumm KVAH for Rest Hours (Zone-3)	Kvah3
18	Cumm KVAH for Off Peak Hours (Zone-4)	Kvah4
19	MD KVA after last billing – (24 Hrs)	MD Kva
20	MD KVA after last billing – Peak Hours (Zone-1)	MD Kva1
21	MD KVA after last billing – Night Hours (Zone-2)	MD Kva2
22	MD KVA after last billing – Rest Hours (Zone-3)	MD Kva3
23	MD KVA after last billing –Off Peak Hours (Zone-4)	MD Kva4
24	MD KVA between last two resets – Peak Hours (Zone-1)	**B Kva1**
25	MD KVA between last two resets – Night Hours (Zone-2)	**B Kva2**
26	MD KVA between last two resets – Rest Hours (Zone-3)	**B Kva3**
27	MD KVA between last two resets – Off Peak Hours (Zone-4)	**B Kva4**
28	Fundamental Kwh	
Mode : 3	**Parameters of this mode should display manually up & down scrolling using push button**	
Sequence	Parameter	Notation
1	High Resolution display for Total KWH	
2	High Resolution display for KVARH-Lag	
3	High Resolution display for KVAH	
4	High Resolution display for Fundamental KWH	

ANNEXURE - II

Tamper Logic & threshold values for 3 Ph. LT CT 100/5 AND 200/5 A static energy meters

Sr. No.	Type of Tamper	Requirement	Tamper Logics / Conditions & (Occurrence & Restoration) Persistence Time					
			Occurrence			Restoration		
			Voltage	Current	Persist Time	Voltage	Current	Persist Time
1	Missing Potential	Phase wise	Vx< 40% of Vref irrespective to any other phase voltage	Ix > 10% of Ib	5 Minutes	Vx > 75% vref i.e. 180 V irrespective to any other phase voltage		5 Minutes
2	Current open	Phase wise	All voltages > 75 % of Vref.	Ir or Iy or Ib < 2% of actual max. current and any one phase has value > 10% Ib	5 Minutes		Ir or Iy or Ib > 2% of actual max. current and any one phase has value > 10% Ib i.e. 1 Amp	5 Minutes
3	Voltage Unbalance	-	(Vmax - Vmin) > 10% of max Voltage of 3 phase voltages and all voltages > 60% of Vref .	Ix > 10% of Ib For at least any one phase	5 Minutes	(Vmax-Vmin) <10% of max voltage of 3 phase voltages		5 Minutes
4	Current Unbalance	-	All voltages > 75 % of Vref.	(Diff. of Actual Max current & Actual Min current) > 30 % of Actual maximum current and all phase has value greater than 10% Ib	5 Minutes		(Diff. of Actual Max current & Actual Min current) < 30 % of Actual maximum current	5 Minutes
5	Current reversal	Phase wise	All voltages > 75 % of Vref.	Ix > 10% of Ib, direction of current reverse and PF value > 0.2	5 Minutes		Ip > 10% of Ib, direction of current forward and PF value > 0.2	5 Minutes
6	Magnetic Influence	-		When magnet influence start affecting the accuracy, meter should start recording at 150 %Imax, UPF	5 Minutes		When magnet influence stop affecting the accuracy, meter should start recording at actual load	1 Minute

7	Neutral Disturbance	-	By injection in neutral, Phase to Neutral voltage for any two phases is > 350 volts and for remaining phase is < 5OV	Ix > 10% of Ib	5 Minutes	Phase to Neutral voltage for all the 3 phases > 75 % Vref i.e 180 volts		5 Minutes
8	Low Voltage	-	Vx > 40% of Vref & Vx< 75 % of Vref	Ix > 10% of Ib For at least any one phase	5 Minutes	Vx > 75 % of Vref		5 Minutes
9	High Voltage	-	Vx > 115% of Vref	Ix > 10% of Ib For at least any one phase	5 Minutes	Vx < 110% Vref (264 V)		5 Minutes
10	Top cover open.	-	Top cover open. At occurrence of Top Cover Open tamper, meter display shall show "C-Open" permanently in auto mode. No display parameter should scroll in auto mode. However meter shall continue to record energy and display parameter shall available in push button mode.		Immedia tely			No restora tion

1. During Neutral disturbance tamper, all voltage related tampers (i.e. Voltage Failure, Voltage Unbalance, High Voltage & Low Voltage) shall not be logged.

2. During High Voltage & Low Voltage tampers, Voltage unbalance tamper shall not be logged.

3. During Voltage failure Tamper, Voltage Unbalance & Low Voltage tamper shall not be logged.

4. During current failure Tamper, Current Unbalance tamper shall not be logged.

5. During power failure duration, if any tampers persisting, those tampers shall not get recovered until it meets the logic for restoration and duration of respective tamper shall be from occurrence of that tamper irrespective of power failure duration.

6. For tamper events logging, snap shot data i.e. instantaneous parameters, active energy register reading (Total Kwh) and date & time should be corresponds to starting of occurrence and starting of restoration.

7. Snap shot of date and time should be available for occurrences and restorations of events.

ANNEXURE – III

HHU SPECIFICATIONS FROM ICS

Requirement and Specification of DLMS/COSEM complaint HHU/CMRI

Communication standards in the Indian metering scenario require supporting considerations for the utilization of those standards in HHUs (Hand Held units) or in CHHUs (Common Meter Reading Instrument). This annexure provides a suitable approach to the implementation of the IEC-62056 standards and this Indian Companion Specification in such devices.

The terms of this suggested implementation are as below.

1) HHUs may retrieve data from DLMS/COSEM Meters conforming to this standard using the same DLMS/COSEM communication port that is provided for remote meter reading.

2) HHUs shall exclusively use the Meter Reading association (MR) and shall support all the features and specifications listed in this specification for the MR Association.

3) HHUs shall have the same data access rights that are available to the MR Association, as that available for remote meter reading.

4) HHUs shall implement the DLMS/COSEM communication standard conforming to this specification to provide a DLMS/COSEM client protocol driver to communicate with the meters to download billing data or perform other services available to the MR Association.

5) HHUs shall provide a DLMS/COSEM server interface to the BCS (Base Computer System – the Data collection software) over a suitable communication medium (Local serial port implementing the DLMS/COSEM CO 3-layer stack is suggested)

6) HHUs shall internally map the individual meter data to logical devices (One logical device for each meter). Inside each logical device the structure and naming of the data shall be the same as that retrieved from the meter.

7) The BCS shall maintain a mapping table that maps the individual meter identifications (the same IDs that are used to identify the meter during remote meter reading) to Logical device addresses. During upload of data from HHU to BCS, the BCS shall query each Logical device to download the data of each meter over the local serial port.

8) The mapping table described in item 7 above shall require that the logical device addresses allocated to each meter are at least unique across all meters that are to be retrieved using one HHU. Other HHUs may re-use the same addressing from their own range of allocated meters. The BCS shall take care to ensure that the re-use of addresses does not create conflicts in meter.

BIDDERS ARE REQUESTED TO READ THE FOLLOWING AS THE PART OF TENDER TECHNCIAL SPECFICATIONS DOCUMENT.

[A] As per tender technical specification and tender document tender sample(s) shall have to be submitted the following conditions are mandatory.

[1] The sample(s) submitted shall have ISI marking as well as relevant IS Number".

[2] The sample(s) not complying the above condition shall not be tested and shall be rejected and no further correspondence shall be made in this regard.

[B] At the end of the tender technical specification, following paragraph should be added and read as under.

The material supplied shall be conforming to Indian Standard Specification and also with ISI marking and even after inspection of the lot, if the material received at site is found without ISI marking , the lot shall be rejected and no further correspondence shall be entertained in this regard.

[C] Security Seal

In addition to 2 Nos. of polycarbonate seals, further 2 Nos. of tamper proof void seals are to be provided on the Meter body in such a way that both the side covers shall be sealed by the tamper proof void seals. The tamper proof void seals to be provided on Meters shall be as per the following specification:

[1] Size of the seal -- 3 x 1 inches.

[2] The seal should be digitally printed on white VOID film having UV destructive inks printed with thermal resin ribbon technology.

[3] The seal should be water proof and should withstand all the weather conditions. The seal should have adhesive of sufficient strength to avoid peeling off under extreme temperature and environmental conditions.

[4]The seal should be sticker type seal and applied on both the side of the Meter which connects the body and the box.

[5]If some one lifts the seal, "VOID" impression should be transferred on the meter and if this is applied back, "VOID" impression should be readable from the surface of the seal.

[6]The disturbed portion of the seal should glow under UV light if the seal is disturbed from any part.

[7]Barcodes of serial numbers should be printed on the seals and the barcodes should be readable with a barcode scanner.

[8]The seals should have continuous variable serial numbers along with security codes of last three digits of serial numbers printed in black and the same serial numbers along with code of serial numbers shall also be printed in a vertical semi circular shape which should be visible only under Ultra-violet (UV) light.

[9]Two security cuts should be given on the seal on both the sides, and if some one tries to lift the seal it should tear off from the security cuts. The security cuts should be made with a computer controlled plotter which should put the security cuts on the same position on each seal.

[10]The name of the supplier and supplier logo along with the security warning or any other information in any language as given by the company should be printed on the seal.

[11]There should be a provision of incorporating officers' signature on the seal as given by the company.

[12]If some one tries to remove the seal by allying heat, the printing should get disturbed and the shape of the seal should change if more heat is applied.

The seals to be used for sealing of Meters are to be fixed after inspection is over.